

Ensuring The High Availability Of Mission-Critical Data And Applications.

About Emerson Network Power

Emerson Network Power, a business of Emerson (NYSE:EMR), is the world's leading provider of critical infrastructure technologies and life cycle services for information and communications technology systems. With an expansive portfolio of intelligent, rapidly deployable hardware and software solutions for power, thermal and infrastructure management, Emerson Network Power enables efficient, highly-available networks.

Learn more at www.EmersonNetworkPower.Asia.

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Trinergy™ Cube from 300 kW to 3 MW

Beyond the Power Revolution





Emerson Network Power, a division of Emerson, is a global company that combines technology with design to supply innovative solutions for the benefit of its customers. Emerson Network Power protects and optimizes critical infrastructure for data centers, communications networks, healthcare and industrial facilities. Emerson Network Power's broad technology base and global expertise support a full spectrum of enterprise-wide solutions for today's vital business needs.



Regardless of your size, you can't afford for your critical business systems to go down and you can't waste time recovering your IT infrastructure after a disruption.

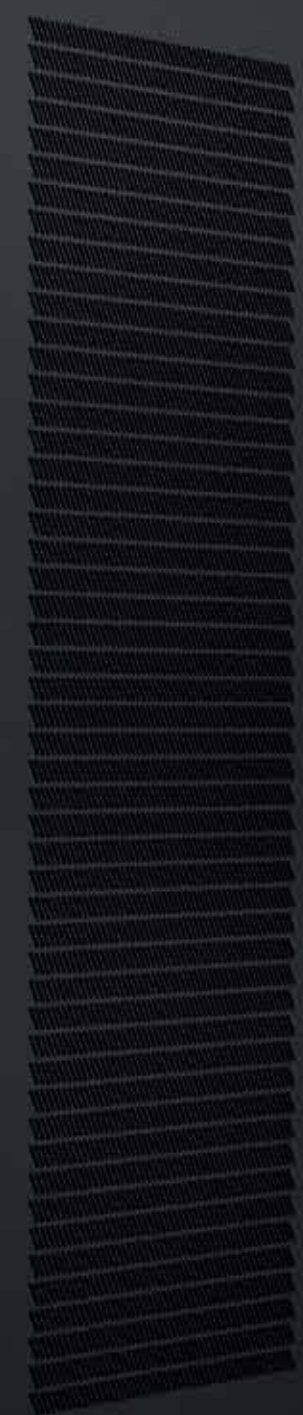
Leave that to us, the experts in grid to chip solutions, from the biggest to the smallest data centers, we are ready to serve your needs.

More standardization, so you don't need further budget allocations to install it. More simplification so you don't need to be a specialist to get the best for your business. More support, so while you are enjoying doing business, we are protecting you.

EMERSON



Trinergy Cube
AC Power Systems





Trinergy™ Cube

The New Generation of Trinergy UPS

Delivering Unsurpassed Performance to Enterprise Data Centers

Highlights

- Highest average operating efficiency in the industry: 98.5%
- Hot scalability up to 3 MW in a single unit and up to 24 MW in a parallel system
- Unprecedented levels of installation flexibility
- Smart capacity - adaptive power rating
- LIFE™ remote diagnostic and preventive monitoring services

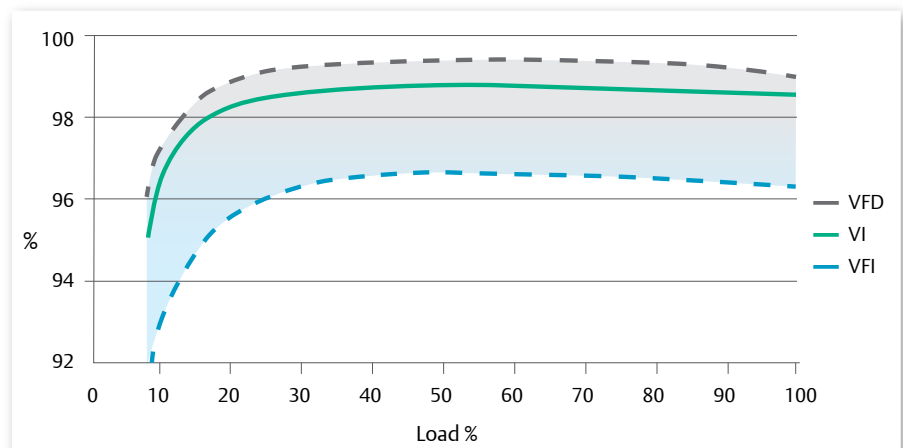
Designed around your IT space, **Trinergy Cube** is ready to evolve with growing business demands. It offers the highest level of power availability as well as reduced TCO, minimum energy consumption and CO₂ emissions.

Trinergy Cube boasts unparalleled features including an **average operational efficiency of 98.5%** and power density per core running up to 400 kVA. Its optimized efficiency at partial load conditions and hot scalability

up to 3 MW means that **Trinergy Cube** delivers adaptability not available anywhere else in the market.

Trinergy Cube's hot scalability, allows it to meet any power system requirement from 300 kW up to 24 MW in parallel.

Trinergy Cube goes beyond the power revolution, to allow the greatest advantages in terms of availability, capacity and efficiency.



Trinergy Cube average operating efficiency of 98.5%

Availability - Uptime Enhancement

Trinergy™ Cube makes your mission critical space a peaceful place through its advanced diagnostic capability, data tracking, measuring and logging, as well as predictive maintenance and event analysis features. Combined with a fault tolerant architecture, concurrent maintainability and hot scalability, **Trinergy Cube** guarantees continuous operation and premium protection for your customers' business.

Key availability features:

- **Remote Diagnostics:** LIFE™ remote diagnostic and preventive monitoring service, increases uptime and operational efficiency by continuously monitoring and tracking performance trends.
- **Predictive Maintenance:** **Trinergy Cube** is capable of verifying the health of its IGBT, capacitors, fans, contactors and batteries to determine maintenance needs and ensure critical continuity.

- **Event Analysis:** precise event tracking, waveform capturing and harmonic spectrum analyses allow the detection of external phenomena that have the potential of impacting data center availability.

- **Data Logging:** **Trinergy Cube** is capable of capturing all relevant data from efficiency to uptime parameters. Access to this information allows data center managers to control their physical space, optimize its usage and independently calculate PUE.



Trinergy Cube LCD touch screen: interface for data tracking, logging and event analysis

Sizing Your System

Scalable up to 24 MW; the highest active power rating available thanks to three dimensional modularity: Vertical, Horizontal and Orthogonal.



Vertical Modularity: the stacked drawers in each core can be individually extracted for service purposes while the UPS continues to protect your load.

Horizontal Modularity: Trineergy™ Cube can scale up to 3 MW in power by adding complete cores (UPS modules) side-by-side and around the input/output power section.

Orthogonal Modularity: is the ability of Trineergy Cube to work with up to 8 complete UPS (fully populated with cores) in parallel.



Capacity & Installation Flexibility

With its high power density cores, **Trinegy™ Cube** is the only static UPS today able to reach up to 3 MW in a single unit, thus allowing extraordinary capacity levels. Furthermore, its new generation architecture and connection types allow **Trinegy Cube** to deliver unprecedented levels of installation flexibility. The system can thus be configured in a vast range of layouts, whether it be a **straight row, L-shape or back-to-back**, the system easily adapts to available floor space.

Adaptability

The **Trinegy Cube** architecture and flexibility features deliver significant infrastructure upgrade cost savings, easily adapting to new or existing installations without impacting power infrastructure.

This is possible through:

- Centralized and distributed paralleled capabilities
 - Simplified cable routing with unlimited input/output power connection availability
 - Three dimensions of modularity for maximum capacity or redundancy
 - Smart Capacity - adapting required power to meet the specific installation conditions in terms of climate management and circuit breaker size
 - Three and four wire - allowing effortless replacement of legacy equipment
 - Seismic compliance - ensuring power protection is available in any geographical location from Italy to Japan.
- Hot scalability - minimized initial investment (CAPEX), adding power cores as business demands grow

Smart Capacity

Adaptive Power Rating

Trinegy Cube intelligently adapts load power supply to respond to the environment conditions of the installation site. The system's I/O Box and cores are rated to operate continuously up to 55°C and provide increased power down to 20°C. Furthermore, the maximum input current is adjustable to meet specific protection rating requirements.

Trinegy Cube's smart capacity ensures the best possible usage of physical infrastructure, providing maximized power to the load and optimizing each individual configuration based on the specific site conditions.



Unparalleled Efficiency

Trinerity™ Cube delivers an unparalleled **98.5%** average operating efficiency and up to 99.5% maximum efficiency, thus reducing operating costs to a minimum.

The unparalleled levels of efficiency and consequent electricity cost savings can be attributed to:

- Latest generation IGBT
- Adoption of a three-level NPC2 topology for both rectifier and inverter
- Hot scalable power cores
- Three dynamic functioning modes (VFI, VFD, VI)
- Adaptive fast transfer

The seamless activation of **Trinerity Cube's** functioning modes ensures the highest level of efficiency without compromising power quality and availability.

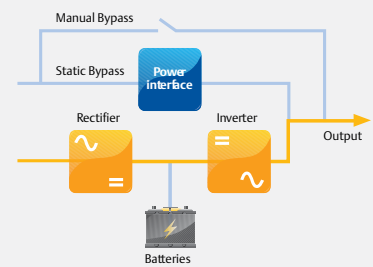
The adaptive fast transfer ensures the quickest response time under various conditions:

- Network fault (voltage variation, high/low impedance mains failures)
- Load fault (short circuit downstream of the UPS)
- Type of load connected (PDU transformer)

The unit is able to discriminate between the various types of interferences and rapidly respond, while at the same time ensuring compatibility with downstream equipment such as servers, transformers, STS or mechanical loads.

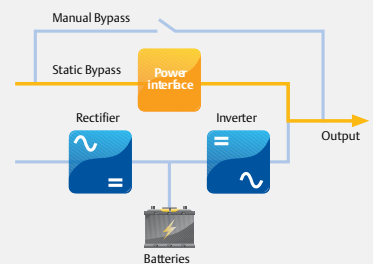
Maximum Power Control (VFI)

provides the highest level of power conditioning and protects the load from all electrical network disturbances.



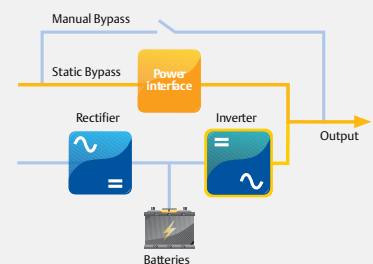
Maximum Energy Saving (VFD)

detects when conditioning is not required and allows the energy flow to pass through the bypass line.



High Efficiency & Power Conditioning (VI)

compensates the load THDi, PF and main sags and swells.



Trinerity Cube dynamic functioning modes

Optimized TCO

Continuous availability, unparalleled operating efficiency, optimized installation space, smart capacity and minimized electrical infrastructure costs, make **Trinergy™ Cube** the ultimate UPS solution with an optimized TCO and rapid return on investment.

Trinergy Cube is the only unit in the market which allows for hot scalability from 300 kW up to 3 MW in a single UPS, thus providing significant electrical infrastructure and space savings. Furthermore, its high power density running up to 400 kVA

per core, allows customers to maximize the number of racks and servers housed in their data center, thus granting more space for IT equipment.

Trinergy Cube's highly efficient technology and TCO capabilities also come from Emerson Network Power's expertise in the area of thermal management. An in-depth study of the ventilation system and internal aerodynamics of the unit has brought extraordinary results in terms of power density and power adaptability for efficient operation in all climates.

Neutral Carbon Footprint

Trinergy Cube's new generation architecture has been designed to reduce energy and heat dissipation, thus minimizing the demand and consumption of air conditioning systems. The combination of these factors, coupled with its 98.5% average operating efficiency, reduces CO₂ emissions to a minimum. This contributes to ensuring that your customers' data centers are a step closer to meeting the industry's environmental and efficiency compliance standards.





LIFE™ Remote Diagnostic and Preventive Monitoring Service

Emerson Network Power's service program is designed to ensure that your critical power protection system is maintained in an optimum state of readiness at all times.

The **LIFE** remote diagnostic and preventive monitoring service provides early warning of UPS conditions and out of tolerances. This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind.



With **LIFE** services you will benefit from:

Uptime Assurance

Constant monitoring of UPS parameters, thus maximizing the system's availability.

First Time Fix Rate

Pro-active monitoring and data measuring ensure that when our customer engineers are dispatched on-site, they arrive prepared for first time resolution.

Proactive Analysis

From **LIFE** service centers, our experts proactively analyze the data and trends of your equipment, to recommend actions to ensure their best performance.

Minimized Total Cost of Ownership of Your Equipment

The continuous monitoring of all relevant parameters in turn maximizes unit performance, reduces on-site maintenance and extends the life of your equipment.

Fast Incident Response

LIFE allows for immediate definition of the best course of action, as a result of the regular communication between your **Trinergy™ Cube** system and our **LIFE** service centers.

Reporting

You will receive a comprehensive report detailing the working order of your equipment and its operational performance.

Customer Monitoring Interfaces

LCD Touch Screen Features

- High security access with separate password levels for users and service engineers
- User-friendly graphical interface
- Single-line mimic diagram showing system status
- Contemporary dashboard-style indicators for major system values and conditions
- Automatic charting display for logged power and environmental data

Hardware Connectivity

Trinergy™ Cube allows for the monitoring and control of networked UPS, through different protocol options:

- The integration of UPS with Building Monitoring and Automation Systems via MODBUS RTU, MODBUS/TCP or JBUS protocols
- The integration of UPS in Network Management Systems through SNMP protocol
- Two slots for additional connectivity cards are available for specific protocol requirements.

Software Connectivity

Liebert® Nform™ will monitor the **Trinergy Cube** via SNMP protocol. Authenticated alarm management, trend analysis and event notification delivers a comprehensive monitoring solution. Available in a variety of versions to suit anything from small computer rooms to multiple location distributed IT networks, Liebert Nform enables:

- Condition based system state recording
- Alarm event exporting to disk
- SMTP email
- Execution of external program
- Shut down clients

Liebert SiteScan® is a centralized site monitoring system which ensures maximum visibility and availability of critical operations. Liebert SiteScan Web allows users to virtually monitor and control any piece of critical support equipment. Its features include real-time monitoring and control, data analysis, trend reporting, and event management.

Trellis™ Platform

Emerson Network Power's Trellis™ platform is a real-time infrastructure optimization platform that enables the unified management of data centre IT and facilities infrastructure.

The Trellis™ platform software can manage capacity, track inventory, plan changes, visualize configurations, analyze and calculate energy usage, and optimize cooling and power equipment.

The Trellis™ platform monitors the data center, providing a thorough understanding of system dependencies to help IT and facilities organizations keep the data center running at peak performance. This unified and complete solution, delivers the power to see the real situation in your data center, make the right decision and take action with confidence.





Customer Experience Center

Emerson Network Power's state-of-the-art Customer Experience Center located in Castel Guelfo (Bologna - Italy), enables our customers to experience first-hand a wide variety of data center technologies, supported by constant consultation from R&D and engineering specialists.



Customers visiting the center will be able to witness pre-installation demonstrations, covering the technical performance, interoperability and efficiency of Emerson UPS systems under real field conditions. These processes can be experienced from the facility's control room, where real-time performance measurements and reporting will be available while providing full visibility of the demonstration area. The center can host simultaneous tests at full load of up to 4000 A.

The customer validation area specifically dedicated to UPS consists of four testing stations, each one providing up to 1.2 MVA of capacity. Testing includes individual modules, as well as complete power systems, with the added possibility of the customer's switchgear support systems being connected, thus guaranteeing smooth, rapid installation and commissioning of large power systems. Testing is also customized based on the complexity, size and number of UPS components in the configuration.

Our Customer Experience Center offers three validation experiences:

- **Demo** - carried out on new products to demonstrate UPS performance
- **Standard** - validation test showing UPS standard technical performances in compliance with UPS catalogue and IEC 62040-3 standards
- **Customized** - session tailored to validating customer's specific technical performance needs.

#CustomerExperienceCenter 



Trinergy™ Cube Specifications

Technical Specifications		
System Range 300 kW - 24 MW		
Core Adaptive Power Rating (kVA)	up to 400	
Core Adaptive Power Rating (kW)	up to 360	
General		
Average Operating Efficiency	98.5%	
Maximum Efficiency	up to 99.5%	
Airflow (m³/h)	up to 2600	
Heat Dissipation at Full Load in VFI (kW)	17-9	
Paralleling	up to 10 cores in one unit, up to 8 units in parallel	
Hot Swappable core	Yes	
Withstand Rating (kAIC)	up to 100	
Audible Noise (dB)	65 dBA (at partial load)	
Altitude Max (m)	1000 m without derating	
Operating Temperature (°C)	0-55	
Input		
Input Wiring	3 ph + N + PE, 3 ph + PE	
Input Voltage Range (V)	200-480	
Input Frequency Range (Hz)	45-65	
Input Power Factor	0.99	
Input THDi	3%	
Soft Start Capability	Yes	
Internal Backfeed Protection	Optional	
Output		
Output Wiring	3 ph + N + PE, 3 ph + PE	
Configurable Voltage Rating	380, 400, 415 V, 440 V, 50/60 Hz	
Permitted Load Power Factor	up to 1, any PF leading or lagging without derating; crest factor up to 3:1	
Output UTHD	<3% (100% linear load); <5% (reference non linear load)	
Overload on Inverter	see Trinergy Cube APP dynamic specification	
Short Circuit Current (A)	1300/850	
General Characteristics		
HMI	12-inch Color Touchscreen Including Web, SNMP, MODBUS/Jbus Protocols	
Multi-language	Standard	
Battery		
Type	VRLA (Li On, Flywheel on Request)	
Charging Method	ABM Technology or Float	
Battery Voltage Range	396-700	
Selectable Charging Current	5 - 70A	
Dimension and Weight	(W x D x H mm)	(kg)
Core	675 x 910 x 1950	620
I/O Box for up to 2 Core Connection	1625 x 910 x 1950	1000
I/O Box for up to 4 Core Connection	2150 x 910 x 1950	1300
I/O Box for up to 6 Core Connection	3800 x 910 x 1950	On request
I/O Box for up to 8 Core Connection	2700x1820x1950 (back to back configuration)	On request
I/O Box for up to 10 Core Connection	3050x1820x1950 (back to back configuration)	On request
Accessories		
External Battery Cabinets with Long-life Batteries, Li-Ion Batteries and Flywheel on Request, Intellislot Connectivity, Maintenance Bypass Switch		
Communications		
Slots	2 Intellislots	
Protocols	SNMP, MODBUS TCP/IP, MODBUS RTU	
Inputs/Outputs	9/8 Programmable	
Compliance with Standards		
Safety	IEC 62040-1, IEC 60950-1	
EMC	IEC 62040-2	
Performance	IEC 62040-3	

Emerson Network Power

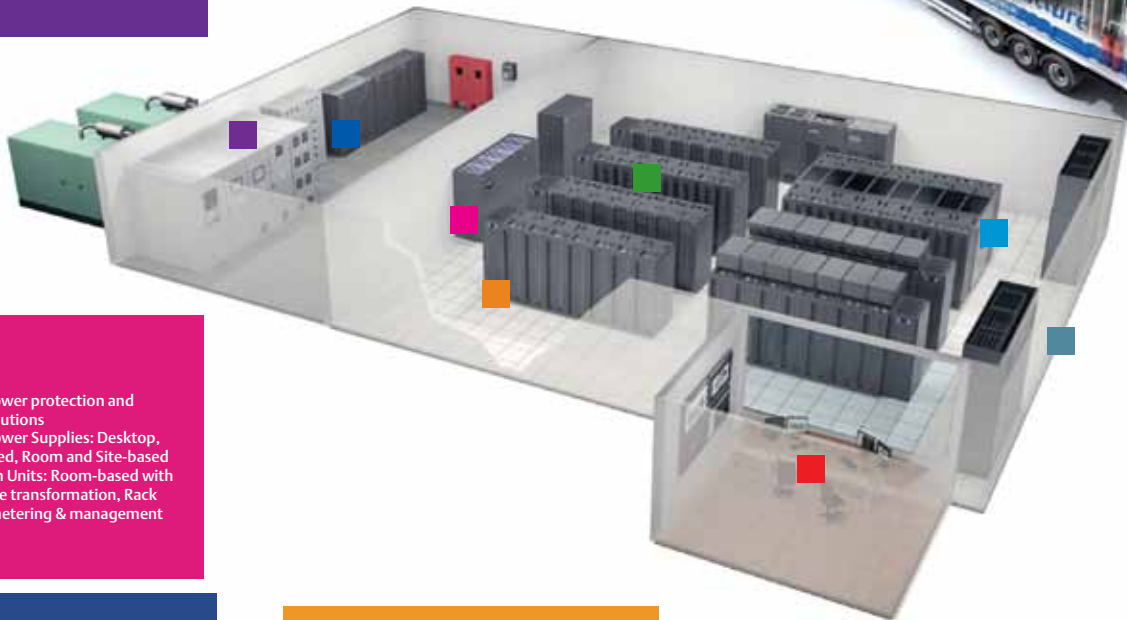
Making your data center as dynamic as your business

⚡ POWER SWITCHING & CONTROLS

- Power switching and controls for emergency, critical, standby and distributed power
- Critical power management systems used locally or remotely
- Load banks up to 15K for generator and UPS testing or exercising
- Surge Protection Devices (SPD) for commercial and critical power markets
- Related services include maintenance, commissioning, product upgrades and reliability assessments

🏢 INTEGRATED MODULAR SOLUTIONS

- Fast and efficient deployment, anytime, anywhere
- Pre-assembled and factory tested to ensure quality and reliability
- Fully integrated power and climate systems
- Custom designs available to meet individual site needs
- Wide variety of applications: oil & gas, mining, military, telecom, data centres



⏻ AC POWER

- Industry-tested power protection and back-up power solutions
- Uninterruptible Power Supplies: Desktop, Rack and Row based, Room and Site-based
- Power Distribution Units: Room-based with metering & voltage transformation, Rack mountable with metering & management capabilities

🌡️ THERMAL MANAGEMENT

- Industry's most efficient and reliable management of heat
- Achieve industry leading efficiency levels (PUE <1.1)
- Complete line of energy efficient, and reliable technology solutions
- Data centre controls and service to optimize efficiency and uptime

⚙️ ENERGY SYSTEMS

- Best-in-class DC Power Solutions adapted by major telecom providers around the globe
- Modular system architecture minimizes capital investment while allowing future growth
- Increased intelligence to match utilization to capacity
- Streamlined technology that reduces failure points and ensures high reliability

SmartAisle™

- Easy to deploy solution for high density requirements
- Provides the components of a high availability enterprise data centre into an enclosed aisle of racks
- Integrated DCIM capabilities for building and IT facilities management and capacity planning
- Visibility of critical infrastructure life signs in a local office, equipped with power protection solution suitable for remote locations or across a distributed network

📊 MONITORING

- 24/7 monitoring of critical equipment activity of data center power and data center cooling at multiple sites
- Emerson Network Power's industry-leading Avocent offers real-time acquisition of data from the data center infrastructure and environment, allowing superior efficiency of monitoring and managing of the data center
- Mitigate power fluctuations and identify specific areas for optimization to determine and apply solutions
- Industry-leading battery monitoring solutions extend battery life, reduce maintenance cost and increase safety



Dynamic Infrastructure Optimization Platform

- Real-time, holistic and autonomic management of the critical infrastructure
- Fast & easy deployment of an industry leading data center solution
- Visibility and control over physical and IT infrastructure layers
- Future-Proof IT offering capacity planning and predictive analysis

⊗ SERVICES

- Complete life-cycle approach from project launch to ongoing maintenance performance optimization
- Largest service footprint in the industry: 945+ Service Field Engineers, 95+ Service Centres, 75+ Technical Support/Response in Asia Pacific
- Project Management, Equipment Maintenance and Performance Optimization capabilities